REMARKS

Claims 1 and 2 were rejected under 35 U.S.C. §102(b) as being anticipated by US Pat. 5,178,150 (Silverstein et al.) Amended Claim 1 describes an ultrasonic intracavity probe for scanning a volumetric region from within the body comprising a handle section to be held during use of the probe; and a shaft section having a distal end which is to be inserted into a body cavity during use of the probe; a pivotally mounted array transducer located in a rigidly dimensioned compartment at the distal end of the shaft section; a motor located in the handle section; a drive mechanism coupled to the motor and the array transducer which acts to move the array transducer during scanning; and a liquid bath constrained to the shaft section to the exclusion of the handle section and located in the compartment at the distal end of the shaft, a portion of which is located between the array transducer and the distal end of the shaft during scanning, wherein the center of gravity of the probe is located in the handle section. As is commonly known, when an ultrasonic imaging probe has a transducer which is swept or oscillated inside the probe to scan a body, an acoustic coupling medium must be located between the transducer and the surrounding acoustic window of the probe to couple ultrasound between the acoustic window and the transducer, as ultrasound does not travel through air without severe attenuation. The common way to do this is to immerse the moving transducer in a liquid such as mineral oil or water. But a liquid is heavy and adds weight to the probe, a problem which is compounded when the probe is an elongated probe such as an intracavity probe. In that case, the liquid not only adds weight but, by the necessity of being at the end of the probe where the transducer is located, undesirably shifts the center of gravity toward the distal (transducer) end of the probe, making the probe more difficult to manipulate and control. The problem is further compounded when the probe is designed for 3D imaging, as a 3D imaging array transducer must be used and not the smaller single piston or annular array transducers which are used in 2D imaging. As stated at the bottom of page 5 of the specification, some of the probes of the prior art such as the one described in the Silverstein et al. patent locate the liquid couplant in an elastomeric bag, which is bulky (col. 5, line 64 of Silverstein et al.) and can tear or rupture, posing a hazard to the patient in whose body the probe is operating. The present inventors have overcome these obstacles by confining the liquid to a rigidly dimensioned compartment in the shaft of an intracavity probe where it provides acoustic coupling between the array transducer and the acoustic window at the distal end of the probe, and still kept the center of gravity in the handle of the probe. Confining the liquid to the shaft also avoids complications of the

liquid passing around or through the motor of the probe in the handle section of the probe, and the rigid compartment is not subject to tearing or rupture and thus does not pose a hazard to the patient.

The Examiner contends that Silverstein et al. shows a pivotally mounted array transducer (52) located in a rigidly dimensioned compartment. The Examiner's contention is that the components located in the flexible fluid-filled bag 62 make up a rigidly dimensioned compartment. This contention is flatly wrong, as the flexible bag 62 defines the dimensions of the fluid compartment and is designed to stretch, varying the dimensions of the fluid compartment of Silverstein et al. Furthermore the Examiner has acknowledged that the Silverstein et al. probe is a two-dimensional imaging probe which only scans a single plane within the body, not a volumetric region as recited in the claim. Moreover, Silverstein et al. does not have a pivotally mounted array transducer as called for by Claim 1, but only a single piston transducer. Furthermore, Silverstein et al. do not suggest anywhere in their patent that the center of gravity of their probe is located in the handle section, as called for by Claim 1. For these reasons it is respectfully submitted that Silverstein et al. cannot anticipate Claim 1 and its dependent Claim 2.

The Examiner's assumption that the subject matter of the claims of this application is and has been commonly owned at all relevant times is correct.

Claims 4-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Silverstein et al. in view of US Pat. 6,039,694 (Larson et al.) Larson et al. describe various hydrogel sheaths which provide acoustic coupling and a microbial barrier when slipped over the exterior of an ultrasound probe. Larson et al. does not show or suggest a liquid couplant bath or compartment, but solid hydrogel sheets. See col. 4, lines 28-66 of the Larson et al. patent. Larson et al. is unconcerned with the design of a fluid-filled probe. Thus, Larson et al. does not show or suggest any of the missing items of Silverstein et al. with respect to Claim 1. Larson et al. describe none of the liquid bath characteristics described in Claims 5-10. For these reasons it is respectfully submitted that Claim 1 and its dependent Claims 4-10 are patentable over the combination of Silverstein et al. and Larson et al.

Claims 11-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Silverstein et al. in view of US Pat. 6,315,710 (Bushek et al.) Bushek et al. describes an implantable hearing assistance device for the middle ear. The system of Bushek et al. is, like Larson et al., unconcerned with fluid-filled ultrasound probes and it has nothing to do with motor-driven ultrasonic transducer assemblies. There is no basis for believing that a designer of ultrasound probes would look to implantable hearing aid devices for technical

features. The Examiner contends that Bushek et al. teach a rotational transducer, but the rotation referred to is adjustment of the stops and barrel required to provide "precise positioning and contact" with the structure of the human ear. Once in place, nothing in the Bushek et al. ear implant moves. Even if Bushek et al. were relevant prior art, it still provides none of the elements missing from Silverstein et al. as described above For these reasons it is respectfully submitted that the combination of Silverstein et al. and Bushek et al. cannot render Claim 1 or its dependent Claims 11-16 unpatentable.

Claims 17-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Silverstein et al. in view of Bushek et al. and further in view of US Pat. 6,621,065 (Fukumoto et al.) Fukumoto et al. is concerned with an optical CCD camera for a testing system. Like Bushek et al., Fukumoto et al. is completely unrelated to a mechanically scanning ultrasound probe with a fluid compartment. The Fukumoto et al. patent provides none of the elements lacking in Silverstein et al. with respect to Claim 1. Since Bushek et al. and Fukumoto et al. are both unconcerned with fluid-filled probes or ultrasound, the combination of Silverstein et al., Bushek et al., and Fukumoto et al. cannot render amended Claim 1 unpatentable. Since Claims 17-20 all ultimately depend from Claim 1, it is respectfully submitted that Claims 17-20 are patentable over Silverstein et al., Bushek et al., and Fukumoto et al. by reason of this dependency.

In view of the foregoing amendment and remarks, it is respectfully submitted that Claims 1 and 2 are not anticipated by Silverstein et al. and that Claims 4-20 are patentable over any combination of Silverstein et al., Larson et al., Bushek et al., and Fukumoto et al. Accordingly it is respectfully requested that the rejection of Claims 1 and 2 under 35 U.S.C. §102(b) and of Claims 4-20 under 35 U.S.C. §103(a) be withdrawn.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectf ully submitted,

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